

USE OF ARTIFICIAL INTELLIGENCE TO PROTECT STRUCTURE

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Abstract

In recent years, artificial intelligence application have found a wide range of application for solving small and large scale civil engineering problems such as design optimization , parameter estimations and identification and damage detection. . The programming of the soil moisture sensor is done and the setup can find time duration and early detection of landslide.the detection of structural failure with the development of an integrated system using Arduino as well as soil moisture sensors. A foundation is a structural element that provides support for various loads acting on the superstructure. Soil moisture sensor, Accelerometer-gyro slope sensor, Humidity Sensor, Arduino, Undermining Safe Support This sensor used in this project.

Terzaghi equation used in vane shear test and direct shear test is used to predict these parameter quickly. vane shear test measure of shear strength of cohesive soils is useful for soils of low shear strength.

Keywords: AI Sensor, field test, laboratory test , building model.

INTRODUCTION

The study has objective a soil is selected in many problems such as design of foundation retaining walls, slab, bridges, pipes, sheet piling the value of the angle of internal friction and soil. Direct shear test is used to predict these parameters quickly. In recent year artificial intelligence application found wide range, the programming of the soil moisture sensor is done and setup can find time duration and early detection of structure check bearing capacity of foundation sensor warn building failure. the structural strength of soil is basically a problem of shear strength. Vane shear test is a useful method of measuring the shear strength of soil.

A foundation is a structural element that provides support for various load acting on the super structure. It is like between the structure and its eventual supports they actual transfer of load may be by direct bearing on the soil. The future settlement foundation and change in water level should not causes any damages the building and to save lots of people and financial losses.

The project focus on the internal soil erosion detection on building the strength of presence of water . the increase in the water content increases the plastic limit and there by soil has a tendency to lose its shear strength. AI can be used to monitor developing problems. Determine when preventive

maintenance needs to be made, or even direct human behavior for optimal security and safety .this will save a lots of lives and financial losses in the future.

METHODOLOGY

1. literaturereview
2. Development data and collection
3. Studytheproperties of soil and failure criteria.
4. TestingofSoil .
5. identify phase based information.
6. Analysis failure criteria.
7. ResultAnalysis.
8. Conclusion.

OBJECTIVESOFTHEPROJECT

- 1) To analyse settlement of foundation.
- 2) To prepare safe structure with use of AI.
- 3) Monitoring real time to structural health.
- 4) Risk of accident may or losses.

EXPERIMENTALINVESTIGATION

TESTRESULTSOF FIELD TEST

1) FIELD TEST

CUBE =150MM X150MMX150MM

$R = WXH/D$

$R = (0.150 \times 0.150 \times 0.150) \times 2400 \times 1 / 0.02$

$R = 405 \text{ KG}$

$SBC = 405 / (0.15 \times 0.15) \times 2$

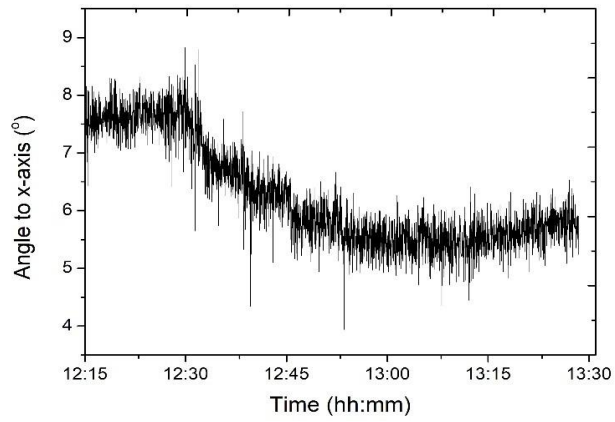
$= 7200 \text{ Kg/m}^2$

Safe bearing capacity $= 7200 \text{ Kg/m}^2$

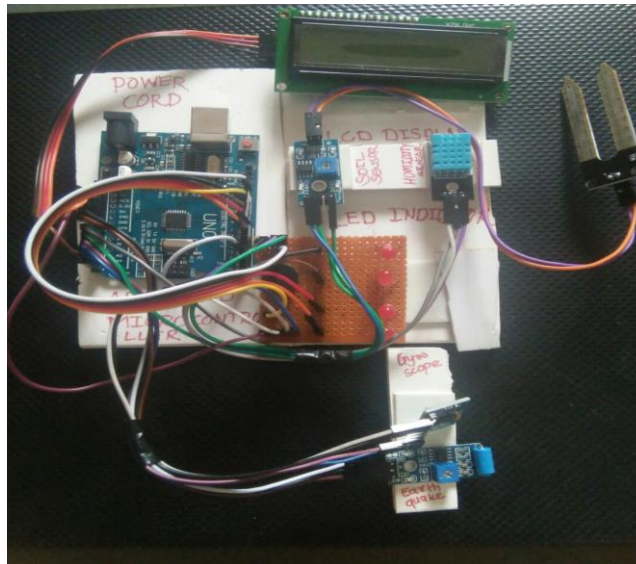
TABLENO.1 TESTRESULTSOF LABORATORY TEST

| SR.NO | NORMAL FORCES (N3) | NORMAL STRESSES $\delta = \delta'$ (KN/m ²) | SHEAR FORCES AT FAILURE (N) | SHEAR FORCES AT FAILURE (N) (τ) (KN/M) |
|-------|--------------------|---|-----------------------------|---|
| 1 | 0.5 | 0.2 | 0,25 | 0.1 |
| 2 | 1 | 0.4 | 0.58 | 0.23 |
| 3 | 1.5 | 0.6 | 0.79 | 0.316 |
| 4 | 2 | 0.8 | 1 | 0.4 |
| 5 | 3.5 | 1 | 1.23 | 0.492 |

Soil slope changing for y axis in degree (0)



Sensor setup



Building model



RESULTS AND DISCUSSION

- After performing compressive strength test on polypropylene, we seen that for 2% replacement strength is slightly decrease but 4% & 6% replacement is failed but important property of this material is crack resistance and also bind the concrete ingredients.
- The concrete show decrease in the strength when the materials is added at the percentage of 6%, comparing to the 2% and 4% to the normal concrete.
- The material PET show high compressive strength comparing to other materials is that PP & PE. When it added with admixture, we found 16% strength are increased are compare to normal mix.
- When admixture is added with the materials, we found that the compressive strength of concrete with 6% replacement is improved.
- After performing Split & Flexural test on concrete we found that it shows desirable results comparing to normal concrete.
- After performing heat resistance test on concrete, we found that the test results PE & PET material are capable to resist heat up to 160 °C but polypropylene material is not giving the reasonable results after performing the heat resistance test.
- Also perform the heat resistance test with admixture then we found that the polypropylene material does not improve strength.

CONCLUSION

sustainable urban development, during the implementation of land-policy reform, the government should strengthen their management systems and ensure the effective implementation of land reform policies. The supervision capacity of government authorities to prevent unauthorized rooftop additions may need to be strengthened, reducing potential damage to occupants in similar collapse incidents. More attention should be paid to social problems associated with the personal safety issues affecting migrant workers. Mandatory regulations for any construction in China, especially for the private self-constructed work undertaken on house-building sites in rural areas should be on the “must-do” lists of government officials, thus minimizing the need for economic migration of workers.

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